Province of British Columbia

Ministry of Lands, Parks and Housing
PARKS AND OUTDOOR RECREATION DIVISION

MEMORANDUM

To: Vince Collins
Assistant Deputy Minister

Date: 85-05-31
File:

This Master Plan for Horne Lake Caves Provincial Park is submitted for your approval.

RECOMMENDED: _____ June 19/85
G. Trachuk
Director
South Coast Region
Date

APPROVED: _____ 26/7/85.
Vince Collins
Assistant Deputy Minister
Date

South Coast Region
Parks and Outdoor Recreation Division
Ministry of Lands, Parks and Housing

HORNE LAKE CAVES PROVINCIAL PARK
MASTER PLAN

MARCH 1985

TABLE OF CONTENTS

LIST OF FIGURES

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The Horne Lake Caves Provincial Park Master Plan was prepared under contract to P.R.P. Consulting of Victoria, B.C.. Mr. Mel Turner, of the Planning Division of the South Coast Region of the Parks and Outdoor Recreation Division was the project supervisor. He was assisted by the following members of the Division staff in providing direction for the project

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Ms. Shelagh Stiven, P.R.P. Consulting, Victoria, B.C.

I would like to thank all those involved in the project for their keen interest and generous contributions.

Bruce K. Downie

P.R.P. Consulting

March, 1985

PART 1

SUMMARY AND BACKGROUND

A. PLAN SUMMARY

Horne Lake Caves Provincial Park is an important cave resource of North American significance. It includes exceptional examples of cave and karst development which must be fully protected and which have high potential to contribute to the public's understanding and enjoyment of the underground environment. The following elements are central to the park plan.

* Resource protection is the primary purpose of the park. Many of the cave resources are particularly fragile. All actions and developments will be done within the context of strict resource protection.

* The Euclataws - Main cave system will be developed as a show cave. This method is considered to be the most effective way to ensure long-term resource protection.

* In addition to the show cave tours of the Euclataws - Main Cave system, spelunking tours of Riverbend Cave and general public access and exploration of Lower Main and Eggshell Caves are proposed.

* A visitor reception, interpretation, services and administration facility is required within the park to facilitate the operation of the show cave tours.

* The focus of development within the park is on the cave tours, above and below ground, and minimal additional development is

proposed within the park. Picnic areas and walking trails along the Qualicum River are the extent of such development. No camping is proposed for the park.

* An assessment of the feasibility of minor land acquisition is required prior to any development of the park.

* Investigations are required to determine the most desirable management approach. The opportunity to involve a non-profit society, cooperative association, or the private sector is significant given the scale of operation and the special nature of the skills required of both staff and managers.

* A comprehensive market analysis and subsequent marketing strategy is required.

* Investigations are required to provide a more complete compendium of base line data for the park.

B. REGIONAL AND PROVINCIAL CONTEXT

Horne Lake Caves Provincial Park is a twenty-nine hectare site at the northwest end of Horne Lake, lying just north of Port Alberni on Vancouver Island (see Fig. 1). The Park is accessible from the east along a gravel road extending from the Island Highway to the east shore of Horne Lake and along the lakeshore to the Qualicum River, a distance of about 16 km. An alternate access route from the west and north along secondary roads is in extremely poor condition.

The Park was established in 1971 at the request of public caving groups on Vancouver Island who were concerned about the potential damage which could affect the caves and the formations they contained. Of particular significance in this respect was the discovery of Euclataws Cave which, because of its special character, made absolute protection a necessity. Other caves on the site had experienced significant use and extensive vandalism from disrespectful users. It was concluded by knowledgeable cavers that such impacts would be inevitable in Euclataws Cave as well unless protection could be assured. The park is solely focussed on the caves which have been discovered at the site along the steep west bank of the Qualicum River at about the 175 m. elevation. The more significant caves which have been explored and named include: Euclataws, Riverbend, Main, Lower Main, Eggshell, Cougar, and Andre's Annex (see Fig. 2).

Since the time of park establishment little has been done to develop the site as a provincial park. Gates have been installed to

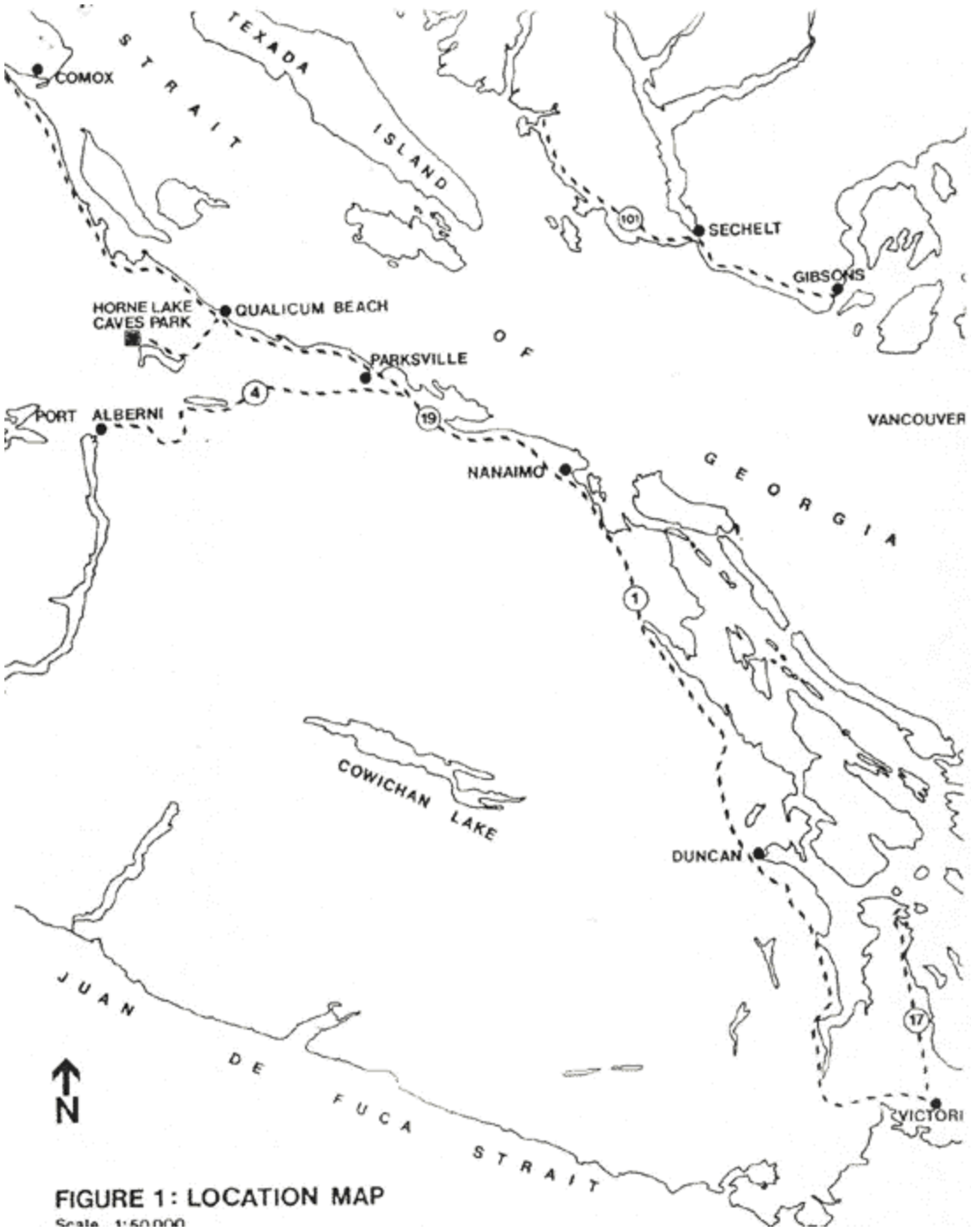
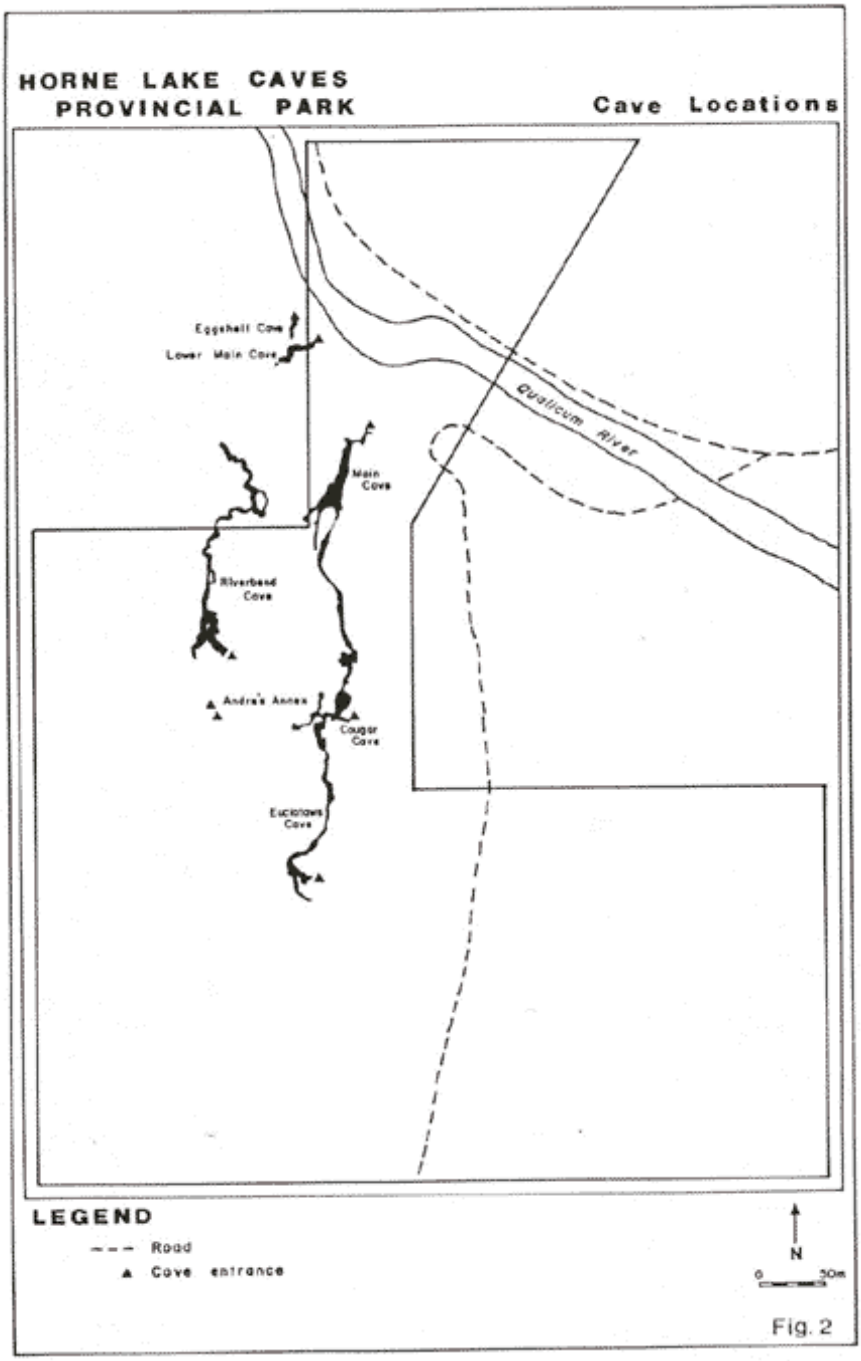


FIGURE 1: LOCATION MAP

Scale 1:50,000


HORNE LAKE CAVES
PROVINCIAL PARK
Cave Locations
Eggshell Cave
Lower Main Cave
Qualicum River
Main Cave
Riverbend Cave
Andra's Annex
Cougar Cave
Euclataws Cave
LEGEND
Road
Cave entrance
N
0
50m
Fig. 2

protect the most valuable caves on the property and access to these caves is limited by the issuing of keys only to knowledgeable and responsible users. Beyond very basic trail and outhouse facilities, other developments were withheld pending the preparation of a long term plan for the park. Such an approach to park development is consistent with the clearly primary focus on the conservation mandate of provincial park status.

The occurrence of caves in Canada is clearly a function of the geology of the country and British Columbia is well endowed with suitable terrain for cave development. However, there is limited knowledge of the resource for a variety of reasons: the lack of coordinated inventory programs; the difficulty of locating caves; and the general lack of access throughout areas of potential cave location. The majority of known caves in British Columbia occur on Vancouver Island not only because of the suitability of the terrain but also because of the well developed road network which has facilitated exploration.

The caves of British Columbia are generally solutional in nature. In comparison to other caves of karst systems around the world, they are of modest proportions. With few exceptions, such as Nakimu Caves in Glacier National Park, they are not especially known for their length, depth, size, biota or cultural significance. However, the documented caves of Vancouver Island include some examples which are extremely well decorated by Canadian standards and Euclataws cave is one of these examples. The significance of Euclataws should not be underestimated. An assessment was made of the cave utilizing the criteria established for National Natural Landmarks in the United States: the presence

of nationally significant features; the condition of the site; and the ability of the site to maintain resource integrity while supporting use.

The conclusions reached were:

> 1. The existing cave system within Horne Lake Caves Provincial Park is a superb example of cave and karst development and is of North American significance.
>
> 2. Under present conditions, Euclataws Cave is in nearly pristine condition, and the cave retains an unusually high degree of natural integrity.
>
> 3. Careful development of Euclataws Cave as a show cave could be accomplished while retaining a high degree of natural integrity. The greatest threat to the natural integrity of this cave is unsupervised visitation with attendant damage and vandalism of natural features." (Aley, 1984)

There is an expert concensus that the cave is of North American importance as a result of the variety, concentration, and pristine condition of the speleothems it contains. The careful development of the cave so as to ensure the required protection is the challenge facing this plan and the Division staff who implement it.

As a component of the British Columbia provincial park system, Horne Lake Caves Provincial Park plays an extremely important role in the preservation of a nationally significant resource and the potential to present that resource to not only the citizens of British Columbia but also to all Canadians. The park is one of the few opportunities in Canada to communicate a message with respect to both the processes of cave evolution and the character and fragility of cave features. This message desperately needs to be communicated if the long term protection of underground resources is to be assured.

Within the provincial park system, karst environments are special features, and are not specifically identified as natural landscapes. However, karst environments are important to the understanding of the geological structure and evolution of many parts of the province and efforts have been made to include and interpret such landscapes. Thus Horne Lake Caves Provincial Park has the potential to play a very significant role in the park system and to contribute to the general public knowledge of the earth in which we live.

Only one other cave park exists in the provincial park system, Cody Caves Provincial Park. While it is able to provide an opportunity for both appreciation of the underground environment and the nature and fragility of the resource, its potential and capacity to do so are limited by its relatively remote location, and the scale and significance of the resource. The role played by Cody Caves Provincial Park needs to be complemented by the development of other opportunities for the public to experience caves.

The provincial park system can contribute significantly to the provision of such opportunities throughout the province. Horne Lake Caves Provincial Park has the level of significance, the quality of resources and the accessible location needed to make it a primary contributor to the public appreciation of underground environments in British Columbia.

As a tourist attraction, the caves at Horne Lake Caves Provincial Park are also a potentially significant resource. Once again the significance, of Euclataws in particular, should not be underestimated.

"Euclataws Cavern is of more than sufficient size, beauty and interest to consider for show cave development. It compares favourably with most of the highest visited caverns in the United States. It is larger and contains features superior to Ruby Falls in Tennessee, which is the second most visited cavern in the U.S. Although not as large as Carlsbad or Blanchard Springs Cavern, its overall visitor appeal would be comparable, and its location is more favourable than either." (Fairchild, 1984)

Recognizing that no comparable resource is available to the public in Canada, this significance as a tourist attraction is increased even further.

Figure 2a shows other developed show caves in North America.

C. RESOURCES

1. Natural Resources

The most significant resources associated with Horne Lake Caves Provincial Park are related to the underground and surface environment of the karst system. While other natural resources, not specifically related to the caves, exist in the park, they are not of special significance and thus are not dealt with in detail in this plan.

Climate

Located in east central Vancouver Island, Horne Lake Caves Provincial Park experiences a typical west coast climate and the related vegetation. Precipitation levels are relatively high, peaking in the winter months with 196.1 mm of rain falling during the month of January. Data for July indicates a total of 78.5 mm of precipitation. The yearly total of 1206.7 mm represents over one and a half times the amount falling in Victoria during the same period. The temperature around the Horne Lake area is moderate due to its proximity to the ocean both to the east and west. The mean temperature for the area in January is 1.6°C with the July mean temperature reaching 16.7°C.

The underground climate, that within the caves, remains relatively constant year-round. The air temperature in a cave generally matches the mean annual temperature of the area. Cave temperatures generally vary little from season to season. In Euclataws there is a marked air current noticeable in the cave which changes direction according to whether the temperature of the outside air is greater or less than the cave temperature. The relative humidity of the air within the caves is generally nearly 100%.

Vegetation

Vegetation in the park is representative of that found in most parts of central Vancouver Island with stands of Douglas fir, western red cedar, and western hemlock. Much of the area surrounding Horne Lake has been logged in the past, as has the land within the park. This past activity is evidenced by a number of large stumps and by the presence of an old abandoned logging road running through the park. The undergrowth is dense and lush due to the high rainfall the area receives. Plants such as salal, large ferns and devil's club are commonplace in the understory. A thick layer of moss can be found in many locations within the park and is indicative of the prevailing moist conditions.

At present, there are no plant species known to inhabit the cave depths at Horne Lake Caves Provincial Park. Water or air carried seeds may live as long as their nutrient sources last while fungal spores can remain dormant in caves for long periods of time unless they come in contact with a suitable substrate or food source. Pollen grains, on the other hand can remained preserved in caves for millennia, indicating peleoclimatic and vegetation conditions. No specific studies have yet been completed at Horne Lake Caves Provincial Park to ascertain the extent of biological life in the caves.

Cave entrances, on the other hand, present an interesting mixture of the underground and surface environments. Here, some of the higher plants can survive because of the presence of at least some degree of light. At Horne Lake, mosses and other moisture loving plants inhabit the cave entrances as most of the portals in the park are sinkholes, stream entrances or springs.

Wildlife

Animal life within caves is generally limited to three main categories, those that must live their entire life cycle in a cave, those that can complete their whole life cycle either within or outside a cave, and those that choose to live in a cave only periodically. At Horne Lake Caves, an extensive study of the biological characteristics of the caves has yet to be done. However, it is obvious through visits to the caves that animals such as the harvestman and the cave cricket are abundant near the caves' entrances. Harvestman clump together in sufficient numbers so as to appear as a continuous mat in the cracks and crevasses of the cave ceiling. Under the light of the visitor the animals "pulsate" - an interesting and frequent scene near the entrances of most of the Horne Lake Caves at certain times during the year.

Geology

The caves of Horne Lake Caves Provincial Park are found within a bed of limestone known as the Buttle Lake Formation. This layer of limestone is part of the Vancouver Island Sicker Group sequence and contains crinoidal fossils dating it at approximately 300 million years old. The limestone varies in exposed thickness from 125 - 310 m. and dips "at about 40° in a direction approximately N 58° W" (Latham, Gascoyne, and Ford, 1978). Surrounding the Buttle Lake Formation and located in part within the park is volcanic rock also representative of the Sicker Group. A small exposure of volcanic rock from the Karmutsen Formation of the Vancouver Group is evident as well (Copland, H., 1982).

Hydrology

Running water represents the most significant factor responsible for the nature of the underground at Horne Lake Caves Provincial Park. It is the reaction of ground water (having slightly acidic properties) together with the limestone (calcium carbonate) that results in the dissolution of rock in some places and precipitation of calcite in others. Evidence of the effects of water are apparent both on the surface through incised channels, sink holes, grikes etc. and underground through eroded rock, stalactites, stalagmites, flowstone walls etc. Caves and karst features reflect the fascinating interaction of rock, water and time.

The Qualicum River, the most obvious water in the park, is large in size and is located in the northern portion. The river receives the majority of water passing through the caves and feeds into Horne Lake. Main Cave, Lower Main, Riverbend and Euclataws Caves all have active, but smaller, streams associated with them. Through studies of cave hydrology it has been determined that Main Cave is an extension of Euclataws and that Lower Main Cave is linked by a subsurface stream to the Riverbend Cave system. Cougar Cave, and Eggshell Cave presently do not have visible streams associated with them. It has also been determined that the current drainage area of the region contributing runoff to the Euclataws and Riverbend area is approximately 580,000 square meters. (Copland, H., 1982)

General Cave Descriptions (see Fig. 2)

Main Cave:

One of the original "old" Horne Lake Caves, Main Cave is the closest of the caves to the start of the park's trails and has its portal only 20 m. above the river. As such it has been known and open to the public since the turn of the century and, as a result, has been subject to extensive damage and vandalism. There remain no intact delicate speleothems or pristine formations within the reaches of the accessible passageways. The few remains of soda straws and stalactites in the visible yet inaccessible parts of the cave are testimony to the degree of damage the caves have been subjected to over the years.

Main Cave is entered through a narrow crack in the limestone bluff which leads into the inner chambers. At the end of the lower portion of the cave is a small stream cascading down a wall and disappearing into the floor. A short distance away is the entrance to what is referred to as the 'cathole', a narrow passage joining Main Cave to Euclataws. It has been filled in, in an effort to prevent unauthorized entry into Euclataws. Another link between the two caves is through the Wind Passage, a small channel which allows air to pass from one cave to the other but which is too small to allow human passage.

Lower Main Cave:

Measuring only 41 m. in length, this cave is much smaller than Main Cave yet presents a similar character. Also one of the "old" Horne Lake Caves, Lower Main Cave has experienced the same kind of appalling treatment with spray paint graffiti, broken bottles, and litter throughout the inner chambers. All the accessible formations have either been removed or severely damaged.
The most significant feature of Lower Main Cave is the stream which runs throughout the length of the cave and exits through an incised channel at the portal. The cave consists of one small chamber and a larger gallery where the ceiling reaches in places up to 8 meters high.

Eggshell Cave:

Eggshell is the smallest of the caves in the area with a length of only 18 meters and is presently not within Horne Lake Caves Provincial Park. The main portal is located approximately 50 meters past the portal to Lower Main Cave and 20 meters above the river. Entrance to the one and only gallery is gained through a narrow, steep opening. Once there, the room is hardly large enough to stand up in and appears oval in shape. At the back of the cave a small passageway that soon becomes unnavigable leads into the hillside. The name of the cave was derived from the hollow-sounding floor a result of a thin coating of calcite deposited over a layer of mud.

Cougar Cave:

Cougar Cave, located on the route to Riverbend but directly over Stage III of Euclataws, is the most difficult of the seven park

caves to enter. The small portal leads into an immediate steep drop of 3.5 meters. At the bottom of the drop there are two small chambers, large enough to fit only one person comfortably. Composed mainly of clay and limestone fragments the cave does not contain the intricate formations that are seen in the others. The most distinguishing feature of the cave is the abundance of animal bones found in its depths.

Riverbend:

Riverbend is one of the more significant caves in the park due to the presence of intact, delicate speleothems. The portal to Riverbend Cave is located higher on the limestone terrace than that of Main, Lower Main, and Eggshell. Entrance is gained through a 0.5 meter square steel plate door installed by the Parks Branch to discourage vandalism and to ensure that all who enter are properly equipped and accompanied by an authorized guide. However, some vandalism in the upper series has still occurred as late as November, 1983.

The initial stages of the cave have developed along a bedding plane dipping steeply to the northwest. Once inside the cave, the stream that disappears in the gulley a short distance before the entrance, reappears 40 meters inside the cave. Only in times of flood is this stream evident between these two points. Just below the entrance, there are two small galleries named the Soda Straw and Bacon Strip Galleries due to the abundance of soda straw and bacon strip speleothems they contain. Continuing down the cave, the slope gradually decreases until approximately 80 meters from the entrance the first of two "flatout crawls" are encountered.

Flowstone display, Riverbend Cave (P. Griffiths)

At the end of these two crawls is what is known as the Siphon, making it impossible to access the remainder of the cave during times of flood.

After this point, the cave is relatively unspoiled and consists of a series of narrow vertical drops leading to highly decorated galleries. The most impressive of these galleries, known as the China Shop, contains abundant spectacular speleothems. As a result of the difficult access through the Siphon and numerous exposed pitches in the lower series, this section of Riverhend Cave has been open only to spelunking tours. These tours have been required to secure the services of an experienced guide and to have the proper equipment.

Euclataws Cave: (see Fig. 3)

Euclataws, the raison d'être for Horne Lake Caves Provincial Park, is undoubtedly the most spectacular of the caves in the park and has been described as of North American significance. The significance of the cave is largely due to the diversity and the concentration of speleothems. As such however, the integrity and value of the cave resource is at stake unless strict management controls are exercised. As an interim measure, the Division has installed a complicated series of gates to prevent any damage from unauthorized entry.

The gated portal to Euclataws Cave is located in a small sinkhole upon the higher limestone terrace about 60 meters in elevation above the Qualicum River. Similar to Riverbend, the entrance series has developed along a steeply dipping bedding plane which continues for approximately 90 meters. The cave then opens into a gradually sloping narrow passageway with a high ceiling known as the "Sidewalk". This area contains a concentrated variety of speleothems.

From the end of the Sidewalk the angle of descent increases again, passing through a series of chambers. The chambers include the Dome Room, Stage III, the Attic, and the Dining Room, descending a total of 40 meters over their length. They are filled with spectacular examples of translucent draperies known as "bacon strips", delicate soda straws and flowstone draperies.

The final stage of Euclataws lies just beyond the Dining Room and

EUCLATAWS - MAIN CAVE SYSTEM

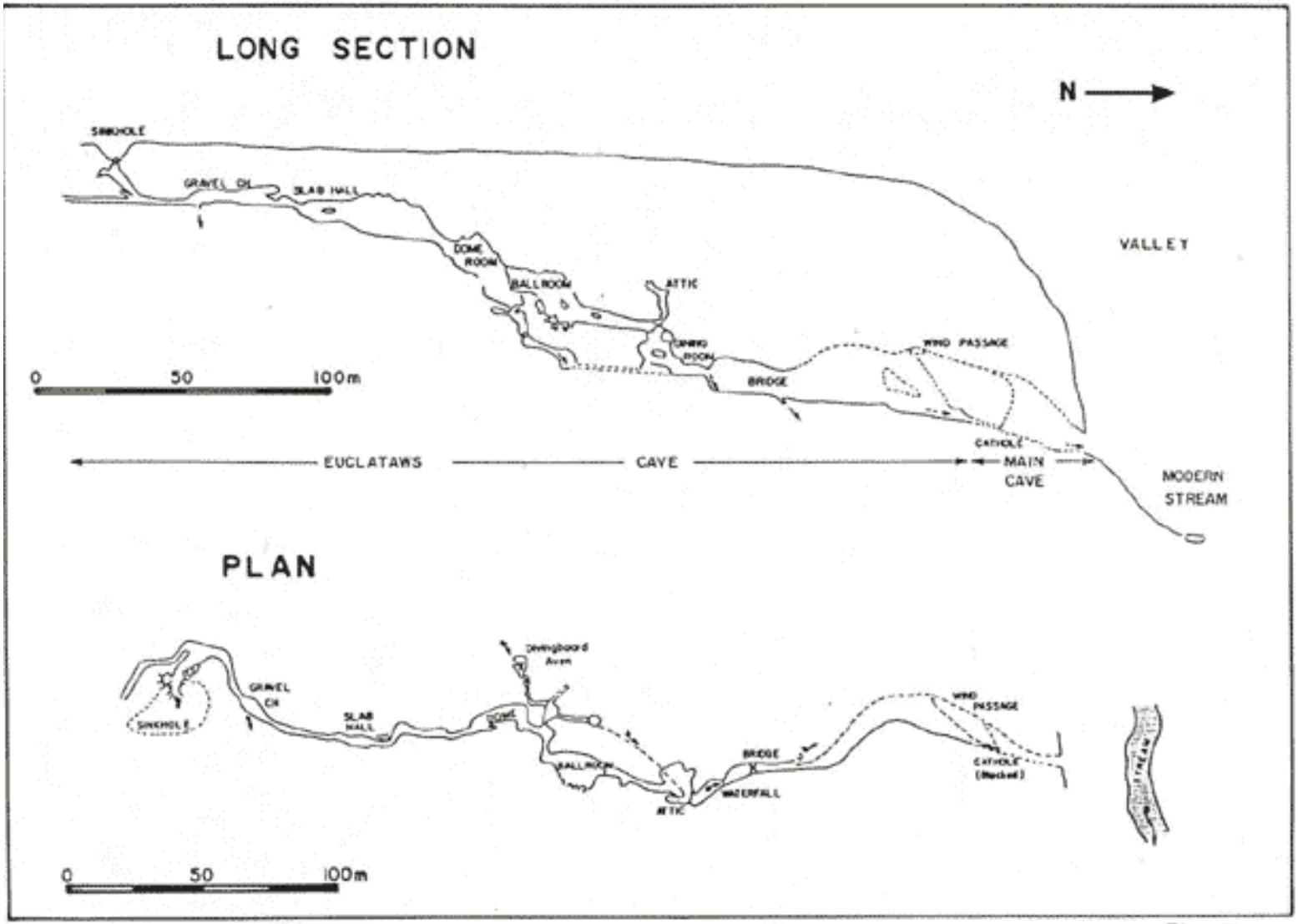
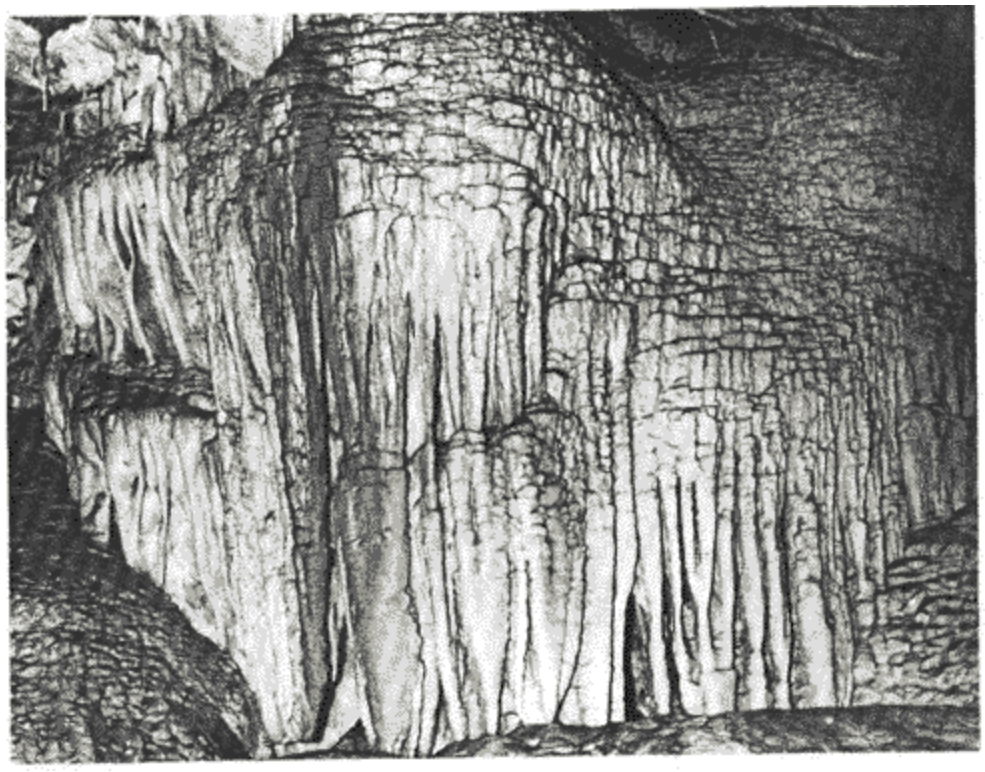


Fig. 3



Flowstone, Euclataws Cave (G.Green)

consists of a large open chamber with a multitude of fascinating and beautiful speleothems. Between the two rooms there is a vertical drop of 4 meters over which an intersecting stream cascades. Along with a delicate Stalagmite Bridge the room displays one of the most impressive sights in the caves at Horne Lake, a canopy known as the Umbrella. At the end of this room is the Euclataws side of the Cathole, a narrow passageway joining this cave to Main Cave. Also visible high in this chamber is the Wind Passage, a similar link to Main Cave.

Euclataws is, with little doubt, the most fragile of the caves. It **is** virtually impossible for even the most experienced of cavers to visit the length of the cave without leaving some trace of the trip. With such an array of diverse quality features Euclataws has potential for both high public appeal and damage.

Andre's Annex:

Andre's Annex is 54 meters in length and located on the limestone terrace approximately 100 meters to the south of Riverbend. Its main portal, of two known entrances, is small and the cave contains numerous hazards such as loose rocks, an exposed drop and a number of tight difficult passages. Water plays an important part in this cave which is being formed by the solution of rock in water. There is an intermittent stream system present and some small-scale speleothems are evident within the cave. Andre's Annex, however, is thought to be relatively insignificant in terms of either aesthetic or scientific value but may be hydrologically significant as the upper portion of the present active Euclataws stream system.

2. Cultural Resources

Archaeological

The caves in the park were first discovered by local Indians although there is a lack of information concerning Indian visitation and no archaeological sites have been identified within Horne Lake Caves Provincial Park or the area immediately surrounding.

Historical

The first written record of caves in the area came after the turn of the century, in 1912, when a geologist noted the presence of caves at the north end of Horne Lake. A few years later, when the area was opened up to eager logging companies the location of the caves was known by local loggers. It is uncertain whether the loggers ventured into the depths of the caves, however it is known that the stream in one of the caves was dammed to provide water for the steam donkeys used in early logging practices.

It was not until 1939 that the caves gained public attention. Two cave explorers were responsible for "rediscovering" what they named the "Horne Lake Wonder Caves". At this point only Main and Lower Main Caves were known although knowledgeable people speculated on the potential for other related caves in the area. The presence of a noticeable air current at the mouth of Main Cave led people to believe there must be a system of caves, of which Main was just a part. In 1941, a storekeeper from Qualicum reported entering a sizable cave almost 1/4 mile long some distance away from the already discovered "Horne Lake Wonder Caves". This was probably the first discovery of Riverbend Cave.

By 1945, the caves had become a known tourist stop for those people who were looking for adventure. A trip to the caves entailed a drive along a gravel road to Horne Lake, then either a boat ride across the lake or a long walk along the north shore following old logging tracks and trails to the mouths of the caves. This increased use of the caves, however, took its toll and by the summer of 1945 a party of explorers noted that many of the once beautiful formations were either broken or removed by souvenir-seekers. This same party located the whereabouts of the storekeeper's cave, Riverbend.

In 1957, the Horne Lake Caves area of approximately twenty-nine hectares was established as a recreation reserve in an effort to ensure opportunities for the public to continue to view the caves in the future. Some six years later a group of cavers from Victoria discovered the two entrances to Eggshell Cave. A discovery in 1968 by members of the Canadian Speleological Society, revealed another cave which they named Casteret Cave. A year after this cave's discovery, it was evident that the true discoverers were a Nanaimo couple who had kept the location of the cave a secret in order to save it from the degradation which had proven to be the fate of the other caves. They had named the cave after an Indian tribe named Euclataws, the name it retains today.

The value of this latest discovery was recognized immediately by members of the Canadian Speleological Society who approached the Provincial Government offering to reveal the location of this 'secret cave' only if the cave would then be protected. In February, 1971 Horne Lake Caves Provincial Park was established and Euclataws and Riverbend Caves were gated. (from Griffiths, Paul. 1975."Horne Lake Wonder Caves")

3. Analysis

Resource Summary

OPPORTUNITIES	CONSTRAINTS
Climatic Resources	
- the quality of the cave experience are is not reliant on good weather Opportunity exists year-round	- lower reaches of Riverbend. inaccessible in times of heavy surface rainfall.
- the comparatively colder cave temperature accentuates the contrast between surface and subsurface environments during the tourist season. In many show caves of the world, this temperature difference is not as noticeable	- relatively cold underground temperature and damp environment has potential to cause hypothermia. Even for public tours underground, cool temperatures will restrict the length of time people will be prepared to spend in the cave
Vegetation Resources	
- attractive forested area provides suitable day-use environment.	- documentation and derstanding of the biological resources of the caves is presently incomplete. A biological study is needed of the cave environment with respect to cave flora.
- vegetation found in cave entrances exhibits interesting characteristics.	

Wildlife Resources

- the presence of certain troglophiles and troglobites provide excellent interpretive opportunities.
- as with vegetation, the wild life resources of the caves and immediate environs are unknown and baseline studies are needed.

Hydrological Resources

- abundance of water on the surface and below ground provides excellent opportunities to appreciate the karst development process.
- Qualicum River presents a potential day-use recreation resource.
- water flows are important to the continued evolution of the cave system.
- special considerations must given to times of flooding,be alterations of water flow, and
- water pollution.
- a detailed study of the area's hydrology is essential because present knowledge is incomplete.
- often the cave streams occupy the available route through the cave making access more difficult and water pollution more likely.

Geological Resources

- contact point between limestone and volcanic rock is evident on the surface providing good interpretive opportunities.

Cave Characteristic Resources

- outstanding karst surface features are evident throughout the park.
- Euclataws is one of the most attractive and easily accessible caves in Canada and the Pacific Northwest.
- Euclataws presents no major physical obstacles to development as a show cave.
- old Horne Lake Caves present a stark contrast to Euclataws and Riverbend.
- Riverbend presents a challenging and rewarding spelunking tour of a wild cave.
- in order to ensure protection of caves, permanent on-site management is necessary.
- *any* development of Euclataws will result in some amount of cave damage. Minor damage is inevitable in order to prevent major damage.
- flooding of the Siphon restricts Riverbend to summer use only.
- carrying capacity based on cave resources for each cave needs to be determined and not exeeded.

Cultural Resources

* the documented human history of the park is limited and beyond the contribution to the story of the cave discovery and use, is not a significant part of the park's opportunities for public use and appreciation.

Resource Evaluation

In evaluating the resources that are contained within Horne Lake Caves Provincial Park in the context of the Parks and Outdoor Recreation Division's recreation and conservation goals, three major points became evident:

*Horne Lake Caves Provincial Park encompasses some of North America's most attractive and outstanding cave resources.

"The Angel's Wing", Euclataws Cave (K. **Sinkiewicz)**

It is the relative accessibility of such a high quality resource to major population and tourist centers and its existence within the provincial park system that makes Euclataws Cave in Horne Lake Caves Provincial Park a unique opportunity for show cave development. While it is noted that with any development of Euclataws some degree of damage to the speleothems will occur, lack of development of Euclataws is riot a viable preservation alternative. The fact that Euclataws can be developed to show cave capacity, requiring only minor disruption of some formations, is also important. Unless continuous supervision of the caves is provided it is inevitable that Euclataws will meet the fate of other caves in the park.

*The caves at Horne Lake Caves Provincial Park have the potential to present a diversity of cave experiences and an appreciation of the surface features of a karst landscape that will inevitably appeal to a wider spectrum of the general public than any one experience alone. With experiences ranging from a fully developed show cave offering lighted pathways, to a wild cave spelunking tour emphasizing the technical aspects of caving in Riverbend, to a flashlight self-guiding tour of Main and Lower Main, Horne Lake Caves Provincial Park can reach a variety of people with different preferences and abilities and impart to them various aspects of the park theme.

*The caves at Horne Lake, by the very nature of their discovery, present within themselves contrast, between careless and sensitive visitor practices, or consumption and conservation. There would appear to be great value in this interpretive opportunity to make evident the accumulative consequences of peoples' actions upon natural resources.

Horne Lake Caves Provincial Park has the potential to uphold, first and foremost, the conservation goals of the Parks and Outdoor Recreation Division by protecting the resource in the most comprehensive and appropriate way possible. At the same time, the park will provide a unique recreational experience and encourage sensitive, knowledgeable use of cave resources.

D. LAND TENURES, OCCUPANCY RIGHTS, AND JURISDICTIONS

1. Leases and use permits: none

2. Fee simple lands: none

3. Other tenures: There exists a road right of way across the northern portion of the park. The right of way consists of 30 m. either side of the existing road within the park (crown land) and only the width of the road on the surrounding private lands.

4. Trespasses: none

5. Mineral claims and developments: The ownership of the sub-surface rights of the park (block 272) and all adjacent blocks lies with the crown. Many of these lands and their mineral rights, belonged to the Esquimalt and Nanaimo Railway as part of the initial E & N land grant but have since reverted to the crown.

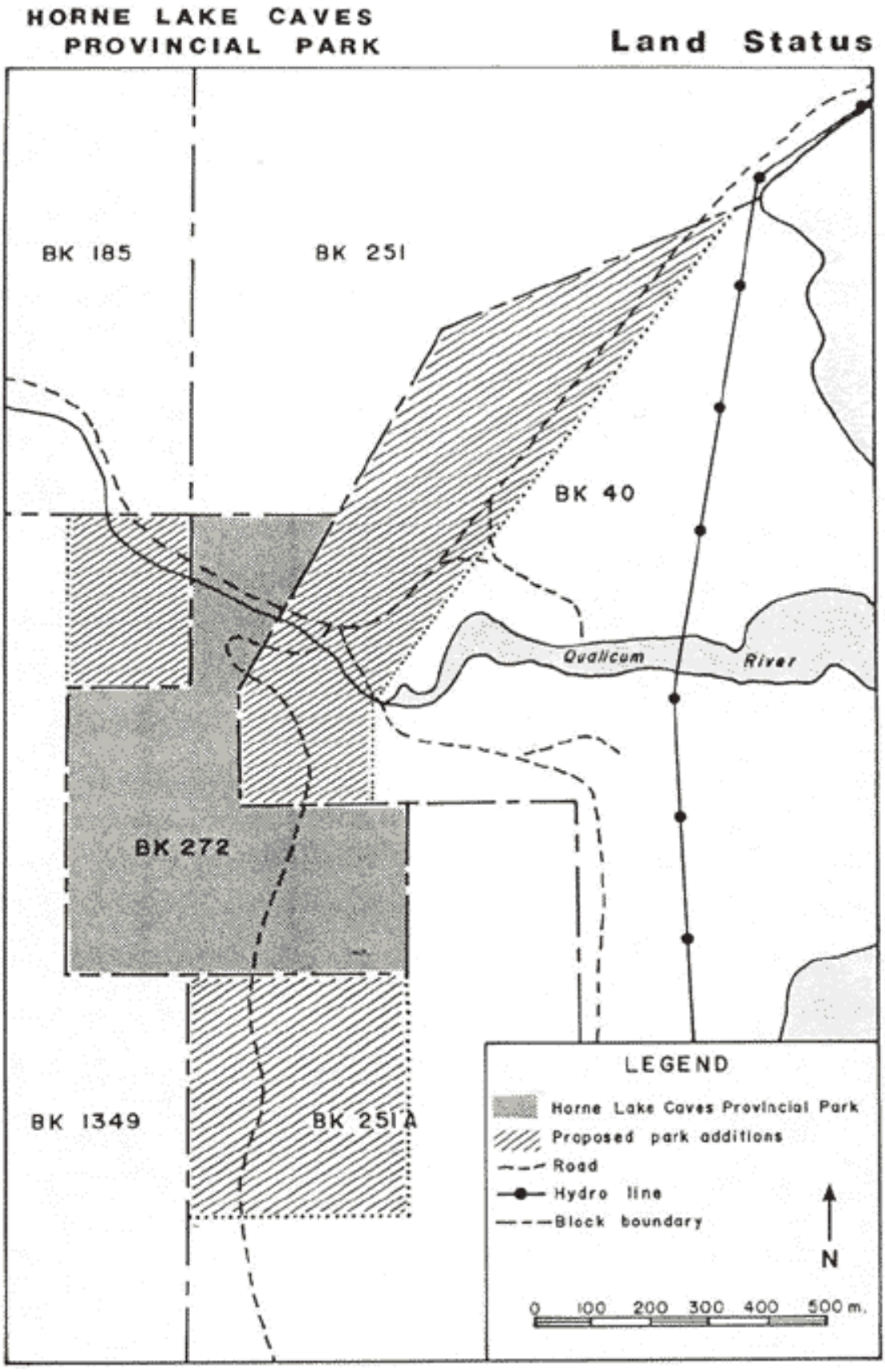
6. Statutory jurisdictions:
   a) Hunting Regulations - the park is closed to all hunting.
   b) Fishing Regulations - the park is subject to existing provincial fishing regulations.

7. Major additions and boundary adjustments: The present park boundary for Horne Lake Caves Provincial Park was considered sufficient, at the time of park establishment, to protect the significant cave resources of the Horne Lake area under provincial park status. However, the total protection of the resource will only be ensured if additional land is acquired adjacent to the park in Block 1349 (see Fig. 4) and if the

caves are developed, requiring on-site permanent staff and sensitive management of the delicate resource. The present park boundary is not considered adequate to incorporate the additional facility development that is required for such development. Therefore, it is recommended that negotiations be initiated with Pacific Forest Products and Texada Logging Ltd. to acquire portions of Blocks 1349 and 40 located adjacent to the park boundary (see Fig. 4). The relatively flat land adjacent to the Qualicum River would be adequate for the required facility development while the higher ground in the northeast corner of the park includes the surface area above Eggshell Cave and portions of Lower Main and Riverbend Caves. Protection of other watershed areas beyond the park boundary can be adequately protected by cooperative agreements with land owners.

LAND STATUS

Land Block	Owners
272	Crown
185	Crown
1349	Pacific Forest Products
251 A&B	Texada Logging Ltd.
40	Texada Logging Ltd.


HORNE LAKE CAVES
PROVINCIAL PARK
Land Status
BK 185
BK 251
BK 40
Qualicum River
BK 272
BK 1349
BK 251A
LEGEND
Horne Lake Caves Provincial Park
Proposed park additions
Road
Hydro line
Block boundary
N
0 100 200 300 400 500 m.

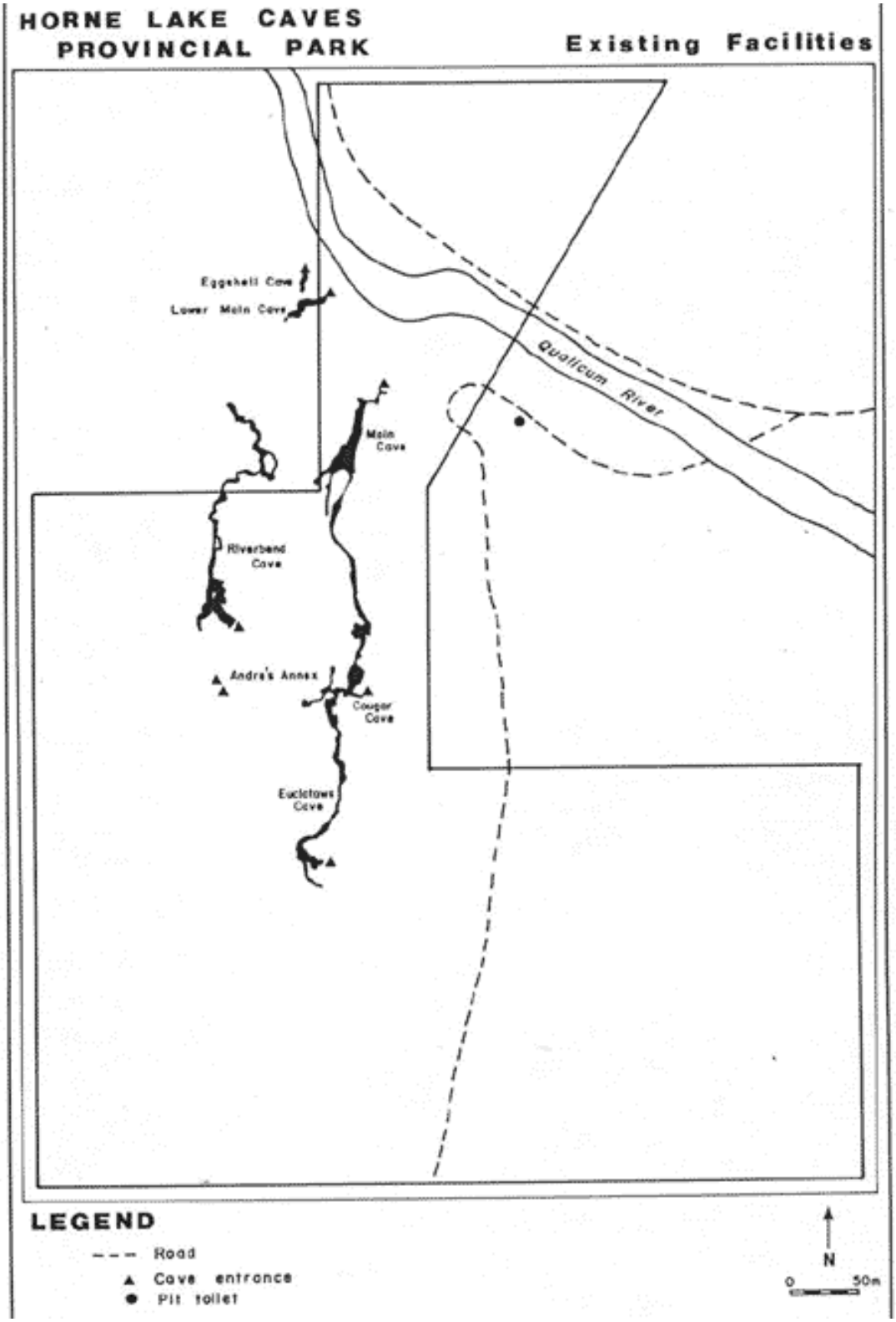
E. EXISTING FACILITIES

Facilities provided by the British Columbia Parks Branch at Horne Lake Caves Provincial Park are minimal (see Fig. 5). They consist of one pit toilet located just to the east of the park's eastern boundary, along the abandoned logging road that intersects the park. Until recently the Parks Branch provided a picnic table for public use. However, as the object of frequent vandalism, it appears to have been removed from the site.

Some trail work has been completed by local caving groups in cooperation with the Parks and Outdoor Recreation Division. There is a trail leading from the bend in the abandoned logging road along the northern bank of the Qualicum River to the portals of Lower Main, and Eggshell Caves. A similar trail exists from the bend in the logging road, up the hill, to the portal of Main Cave. These trails are serviceable but have not been highly developed

Signing associated with the park is limited to a few unofficial signs both en route and within the park indicating the road and trail routes to the caves. Also associated with the park, although not within the boundaries, is a parking area (6 - 8 car capacity) on the southern bank of the river just to the east of the park boundary. Access across the river is provided by a private logging road bridge owned and maintained by the owners of Block 40, Texada Logging Ltd..

The provision of access to the park's seven caves has been of concern to park officials since the park's establishment in 1971.


HORNE LAKE CAVES
PROVINCIAL PARK
Existing Facilities
Eggshell Cave
Lower Main Cave
Qualicum River
Main Cave
Riverbend Cave
Andra's Annex
Cougar Cave
Euclataws Cave
LEGEND
Road
Cave entrance
Pit toilet
N
0
50m

By the time the area first came under park administration, Lower Main and Main Caves had long been known and open to the public. Both had been significantly vandalized and damaged. Riverbend Cave, while not well-known, had been damaged to a lesser extent. The whereabouts of Euclataws Cave became public knowledge in 1969 and soon after, parks officials had gated its entrance in an effort to protect the delicate formations and exquisite beauty of the cave. Also at this time the entrance to Riverbend Cave was gated to prevent further degradation of the resource.

The policy of the Parks Branch since this time has been to:

i) restrict entrance to Euclataws Cave to only those people who, through a visit to the cave, will gain sufficient knowledge to make an original contribution to speleology. Permission of access will only be granted after receipt of a written proposal outlining the type and extent of work to be done and on the agreement that Parks Branch will receive a descriptive account of the trip and any document that draws on the knowledge gained from the trip.

ii) restrict entrance to Riverbend Cave to only those people who are properly equipped and have guides of acceptable experience and responsibility.

iii) allow unrestricted entry into all other caves in the park Main, Lower Main, Eggshell, Cougar, and Andres Annex).

F. MARKET ANALYSIS

1. Existing Use

Horne Lake Caves Provincial Park has no significant development and public use is not encouraged. The major cave resources have been gated and access is strictly controlled. This situation has two opposite effects. For the caves which are gated a clear appreciation of the amount of legitimate use is possible. However, with no permanent on-site management, the restricted entrances have seemed to invite vandalism of the gates and subsequently of the caves by unauthorized users. For the park as a whole, both the other caves and the remainder of the park area, the amount of general public use is unknown.

Periodically over the years since the park was established, guided tours of the caves have been undertaken by the local caving groups in cooperation with the Division. Lower Main, Main and Riverbend caves were the focus of these efforts. The success of the programs has been varied as a result of the logistical problems of accommodating visitor numbers, scheduling, advertising, equipment and financial resources to carry out the program. In every case, however, the public response to the tours has been substantial. People have consistently found the experience rewarding.

Table 1 is a summary of visitor use statistics for selected years when major guiding programs were undertaken. It should be noted that in 1974 and 1982 the dates identified are weekends and are the only dates tours were offered. In 1973, weekend dates were

selected for comparison but tours were offered upon demand during the summer months.

ATTENDANCE COMPARISONS FOR TOURS OF HORNE LAKE CAVES

1982			1974			1973		
DATE RESERVED		TOURED	DATE RESERVED		TOURED	DATE RESERVED		TOURED
July 24	73	83	July 27	0	41	July 21	-	77
25	68	94	28	0	38	22	-	118
Aug. 7	61	77	Aug. 10	0	24	Aug. 11	-	100
8	41	72	11	4	63	12	-	75
21	39	78	24	0	24	25	-	54
22	28	70	25	0	44	26	-	102
TOTAL		474			234			526

Table 1

Statistics from these tour programs (at least in 1974 and 1982) indicated that the vast majority of visitors were predominantly local, that is residents of Vancouver Island. Such statistics were not kept for 1973. This lack is unfortunate as a noticeable difference in the proportion might have indicated the degree to which the prior reservation system used in 1974 and 1982 might have influenced the proportion of visitors that were tourists. More significant than the reservation system, however, in creating a predominantly local audience was the marketing of the service that was available. Like the service itself, advertising was limited due to limited funds. Efforts were focused on the local area and on the campground at Rathtrevor Beach Provincial Park at Parksville.

2. Supply

British Columbia is well endowed with caves and many have interesting characteristics that would be attractive to the general public. However, very few caves are readily accessible and safe for the inexperienced user. Horne Lake Caves Provincial Park, specifically Main and Lower Main Caves, provides one of the few locations in the province where the general public can safely explore the underground environment. It also has the opportunity for the more experienced spelunker to explore a beautiful and wild cave, Riverbend. The fragile nature of the underground resources of Riverbend cave have made it necessary to gate the cave and allow access only on a guided tour basis where a competent and responsible caver is allowed to guide small groups on the 4 - 5 hour trip.

"The Umbrella", Riverbend Cave (VICEG)

General tours of the readily accessible caves in the park have been available only sporadically depending on the availability of funds to support the efforts of local caving clubs which have undertaken the tour programs. The only other location in the province where guided tours have recently been conducted in caves is at Cody Caves Provincial Park where similar public interest has been found.

Show cave tours are plentiful throughout the United States and Europe in a wide variety of caves. In spite of the demonstrated public interest and the successful operation of such facilities, no similar opportunities are available in Canada.

3. Potential

Caves, by their nature, evoke a great deal of public interest and in spite of the limited opportunities in British Columbia for guided tours, and their remoteness in many cases, a wide range of visitors take part. Indications are that if more tours of attractive and interesting caves were made available, a large potential audience exists.

Considerable potential is recognized for the show cave experience that is proposed for Euclataws Cave in Horne Lake Caves Provincial Park. The North American significance of the resource and the relatively accessible location make it a good candidate for development as a tourist attraction that would draw large numbers of visitors to Vancouver Island or extend the stay of those already present. The location of the park has the potential to supply ample visitors to make the development economically very attractive. An estimated 1/4 million visitors during the summer season might be possible at the park, given proper development and promotion - a definite contribution to the tourism industry and general economy of the Island (Fairchild, 1984).

G. PLANNING ISSUES

Since the time Horne Lake Caves Provincial Park was established the need for a comprehensive plan for the park has been recognized. However the urgency of implementing such a plan is becoming increasingly felt as the years go by and as greater and greater pressure is put on the park by the public. A number of extremely important questions must be answered by the plan if effective management and presentation of the caves to the public is to be achieved. These key questions and the proposed solutions are briefly described here. Further details are incorporated into the appropriate sections of the plan.

1. Protection/Security

The most important question to be resolved by this plan is that of the mechanism for protection of the cave resources of Horne Lake Caves Provincial Park. These resources are significant enough to warrant long term protection in the most efficient and sensitive way possible. It is recognized that the park will increasingly be subjected to the pressure of visitors seeking to explore the caves and that the risk of vandalism will also increase.

Protection of the cave system and its concentration of features is the primary purpose of the park and all management and operation should reflect that goal. Expert opinion concluded that this long term protection necessitates constant surveillance of the resource and will most effectively and efficiently be accomplished through sensitive development of the caves for public access. Experience elsewhere has shown that such an approach is advisable and indeed necessary for complete protection.

2. Boundaries

At the time the park was established little study had been done of the extent and functioning of the system of caves along this segment of the Qualicum River. It was also impossible at that time to have been able to assess the needs of the park landbase to accommodate visitor use and facility development since no concept of the appropriate development had been accepted. At this time, however, it is crucial to the long term viability of the park and the protection of the cave resources to assess the extent of park lands and, to recommend alterations.

Ideally park boundaries should extend to encompass the entire watershed area which has created and maintains the cave system. However, adjacent land uses are neither of sufficient intensity nor impact on the evolution of the underground system, that such park acquisition is presently not considered necessary or desirable. At the same time it is considered important to establish more precisely the nature and extent of the watershed for the caves and to establish a working agreement with the adjacent land users regarding the limitations on use which would ensure protection of the cave resources.

Development of the park for public access to the caves as a mechanism for protection has a more pressing implication for boundary adjustment.

Supporting facilities to receive visitors and service the necessary developments requires space and access that are limited by the present configuration of park boundaries in conjunction with the topography of the site. For effective park management and visitor access to be provided, additional land is considered essential. Specifically, lands on both sides of the Qualicum River on the eastern side of the park as well as portions of Block 1349 overlying the Riverbend lower cave system should be investigated for acquisition. Similarly the status of the access road to the park, and its potential for upgrading and public use should be confirmed.

PART 2
THE PLAN

A. PARK PURPOSE AND OBJECTIVES

1. Park Purpose

The caves at the northwest end of Horne Lake have been a natural attraction for local explorers and cavers for many years. When Euclataws cave was discovered and its character became more widely known it became clear that the caves of the area required greater protection than was possible through the volunteer efforts of the caving clubs on Vancouver Island. The establishment of the area as a provincial park widened the purpose of the area from what had previously been a focus on the recreational caving opportunities, to a more prominent emphasis on the protection of the very special resources that have been discovered on the site. Indeed in keeping with the North American significance of these caves and the formations they contain the following purpose statement has been identified. Priority is clearly understood in the order of the dual role of the park.

The purpose of Horne Lake Caves Provincial Park is twofold:
1. to protect in perpetuity the limestone caverns and diverse natural formations found in the Buttle Lake Formation of Vancouver Island within the park; and
2. to encourage public understanding and appreciation of the karst landscape and features focussing on the cavern system in the park.

2. Park Objectives

To fulfill the park purpose, more specific and measurable objectives are required which will direct future park management, development and use. To reflect compatibility with the goals and objectives framework of the provincial park system as a whole, these objectives have been grouped according to their emphasis on either the conservation or the recreation mandate.

Conservation:

1. to preserve the natural qualities of the caverns and speleothems that are found within the park;
2. to retain as much as possible a natural setting for the surface karst features contained within the park;
3. to restore where possible a more natural condition of cave features that have been altered by the actions of previous visitors to the caves;
4. to encourage the conduct of appropriate research on cave formation and management;
5. to encourage the sensitive management of lands adjacent to the park.

Recreation:

1. to provide an opportunity for visitors to experience being in an underground environment;
2. to increase the visitors' awareness of the fragility of the underground environment and the need to adequately protect it;
3. to increase the visitors' knowledge of the geological and hydrological processes that contributed to the development of caves and the nature of the depositional features that are illustrative of cave evolution;

4. to reflect the character and resources of a karst region, in the development of the caves and associated facilities in the park;
5. to provide a destination visitor attraction that will contribute to the local and regional tourism economy;
6. to provide an opportunity for visitors to safely experience caving in a wild cave.

3. Interpreting the Cave Experience

An interpretive context for Horne Lake Caves Provincial Park will need to encompass the full range of messages that will be communicated to park visitors. To identify such a theme consideration was given to two especially significant ideas that are fundamental to the interpretive program for the park. They are the significance of the park's resources and the importance of the system concept of karst features . It is from these basic ideas that other more specific messages are defined.

Horne Lake Caves Provincial Park is significant in the province, Canada and North America, because it is has an outstanding concentration of speleothems that are abundant, diverse, and of high quality. Combined with these resource characteristics is the relative accessibility of the Horne Lake caves and the opportunity for the area to serve the needs of the public due to its current status within the provincial park system.

The park objectives, as stated previously, clearly reflect the central focus of the park experience as being that of the underground environment. However, more than just being underground is needed for the essence of the park to be communicated to the visitor. The awareness of and appreciation for, the interrelationship between the underground and surface features which make these caves significant is also a fundamental component of the park experience if the visitor is to be served.

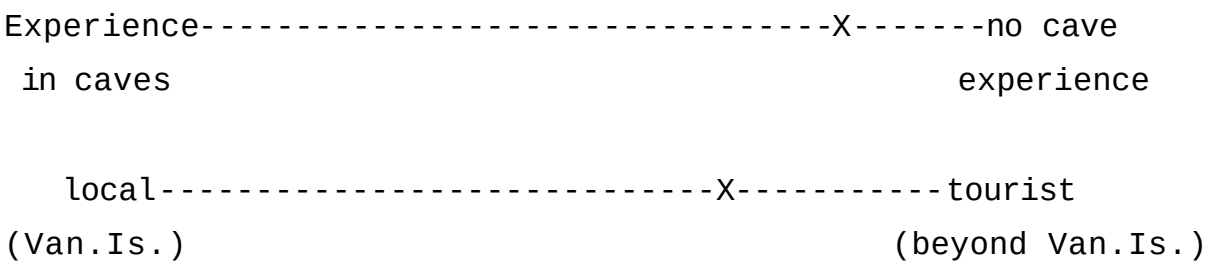
Realizing the importance of relating the surface and underground features as part of a whole system, it is important that the park be developed in such a way as to guide visitors through the following sequence of experiences. Also noted are the messages that might appropriately be conveyed.

1. Orientation/Reception
   - introduction to Horne Lake Caves Provincial Park
2. The Context (approach to the cave)
   - formation of caves
   - formation of karst caves and landscapes - surface features
3. The Cave Experience
   - underground features - life underground
   - relationship of underground to surface
   - fragility and conservation
4. Reinforcement (after the cave experience)
   - evolution of karst cave environments - fragility and conservation
   - caves in British Columbia and Canada - the Provincial Parks System

4. The Visitor to Horne Lake Caves Provincial Park

It is imperative that much more careful consideration be given to describing the potential visitor to Horne Lake Caves Provincial Park. Preparing a visitor profile, and describing trip characteristics as part of a marketing study/strategy will provide much greater detail and confidence for site design and interpretive planning.

From an appreciation of the park resources and the desired audience for the park's message, general priorities were established. The characteristics of potential visitors to Horne Lake Caves Provincial Park vary significantly. However, two characteristics are considered particularly significant in determining the primary audience for the park interpretive program. These characteristics are the level of experience in the cave environment and the place of residence relative to Horne Lake Caves Provincial Park. Two continuums of these characteristics are illustrated below and an "X" marks the position on the continuum which is considered the characteristic of the visitor which is the priority for determining the nature of the development at the park.



The priorities of visitor types for the park are:

1. the non-experienced tourist
2. the non-experienced local
3. the experienced tourist
4. the experienced local

The intent in establishing such priorities reflects the importance of communicating with as wide a public audience as possible. The message is both the nature of the cave and karst resources exemplified by those that can be experienced in the park, and the importance of respecting the integrity of not only these resources but others, wherever they may be found. The message is not focussed at already knowledgeable cavers nor at a highly localized market. The potential in Horne Lake Caves Provincial Park is to reach an international market with an important and enjoyable learning experience.

B. ZONING

All three zones within the provincial park zoning system have been incorporated into the zoning plan for Horne Lake Caves Provincial Park. Zoning specially describes the variety of areas within the park where the balance between preservation and use varies according to the objectives of the park. Clearly special protection is needed for the recharge areas of the caves and at the same time high intensity visitor use areas are needed to provide for visitor reception and orientation to the park. Between these two extremes are areas of limited facilities providing for general recreational activity (see Fig. 6).

The accepted provincial park zoning system is a surface system which was not designed to accommodate the three dimensional nature of this park. However, it should be recognized, beyond the identified surface zoning, that the underground environment is an area of the park where preservation is foremost and that development and visitor activity are only possible within the framework of resource protection. Other critical areas on the surface which contribute to this resource protection objective have been zoned as a sub-zone of the wilderness zone. Great importance is attributed to these special resource areas for the health and protection of the caves. In the surrounding parts of the park, a general wilderness zone has been identified. Limited use of this zone is desirable since its primary purpose is to serve as recharge areas for the cave systems. Adjustments to the present zoning plan may be necessary as a result of proposed resource studies.

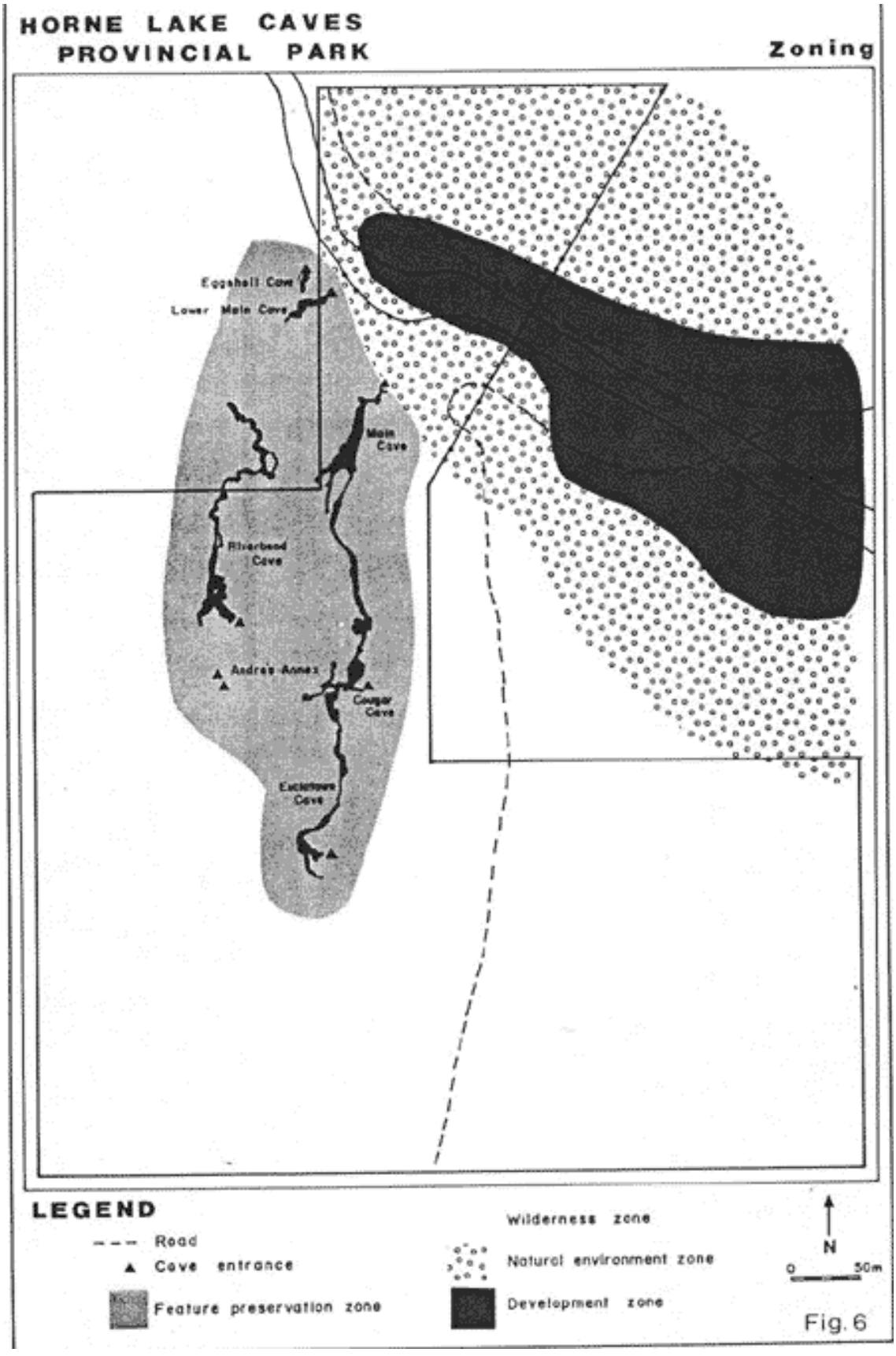

HORNE LAKE CAVES
PROVINCIAL PARK
Zoning
Eggshell Cave
Lower Main Cave
Main Cave
Riverbed Cave
Andres Annex
Cougar Cave
Exclusive Cave
LEGEND
Road
Cave entrance
Feature preservation zone
Wilderness zone
Natural environment zone
Development zone
N
0
50m

Fig. 6

On the other end of the spectrum is the development zone which has been identified to provide an area for the provision of visitor parking, reception, interpretation and administration. Additional lands are considered crucial to the effective development of the park, and an area not entirely within the boundaries presently has been identified as the development zone.

In addition to these clearly defined areas of protection and development are other areas identified as natural environment zones which tend to be located along the Qualicum River. Trails, both for self-guided interpretation and general hiking, as well as picnic sites will be characteristic of these natural environment zones.

C. DEVELOPMENT PLAN

The development concept for Horne Lake Caves Provincial Park focusses on the development of the Euclataws - Main cave system as a show cave for general public access. This fundamental component of the plan dramatically affects the development level of the park. In addition to the specific cave access facilities, reception, orientation, interpretation and visitor services will be needed to complement the show cave development.

To supplement the public tours of the primary cave system, a range of other activities and facilities are proposed. Guided tours into Riverbend Cave, general public exploration of Lower Main and Eggshell Caves, guided and self-guided surface trails, general walking trails and picnic facilities are all included in the development plan (see Fig. 7).

This plan is the long term view of Horne Lake Caves Provincial Park and although there are *many* studies to be done and alternative development and management strategies that could be followed, the final result is described here. The character of the plan is based upon a number of fundamental conclusions reached about the park and the relationship between proposed activities and facilities which have been discussed elsewhere in the plan. The most significant of these conclusions are:

1. show cave development of Euclataws cavern is the most effective form of long term resource protection;
2. the cave resources are of North American significance and are highly attractive;

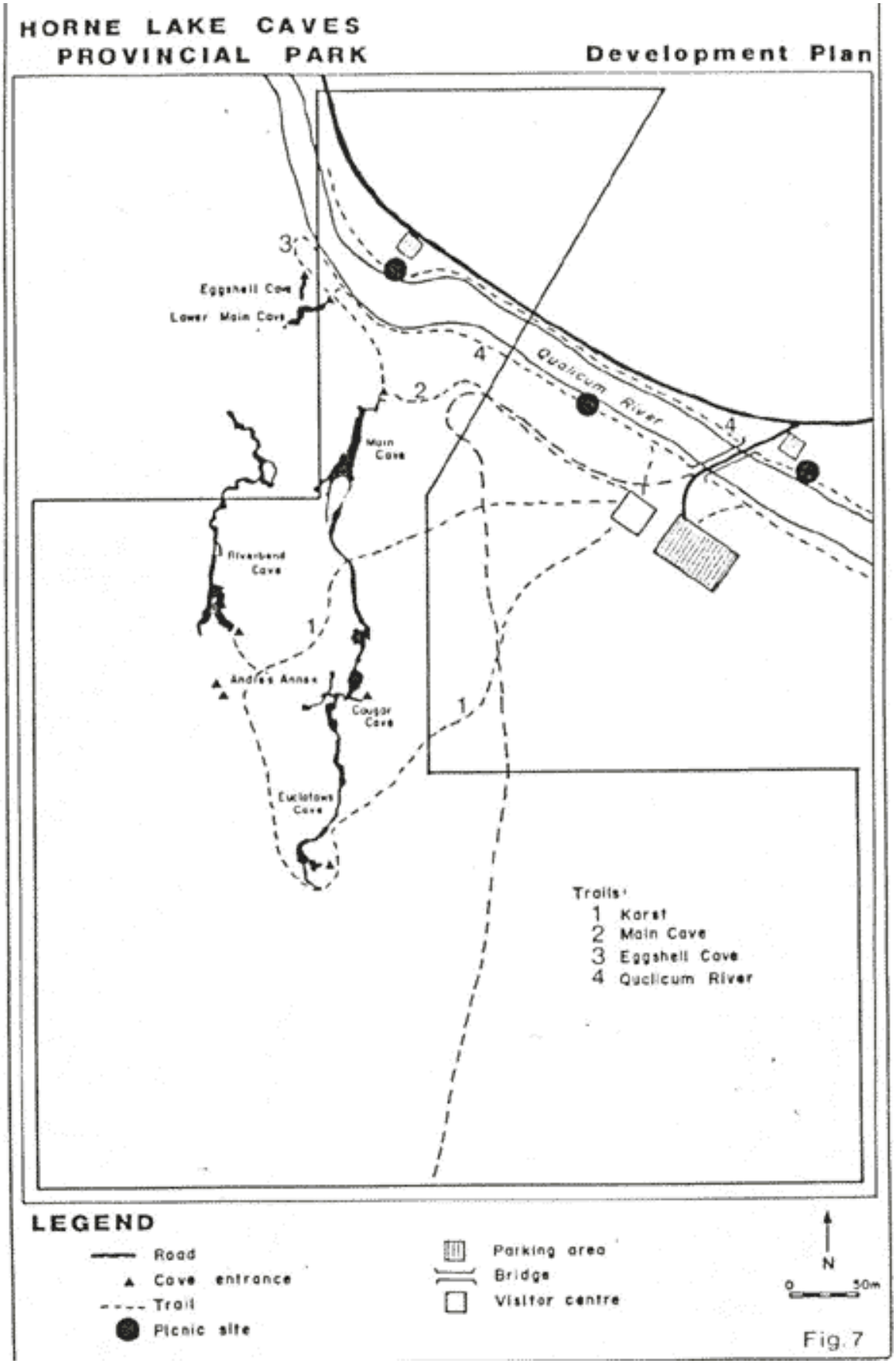

HORNE LAKE CAVES
PROVINCIAL PARK
Development Plan
Eggshell Cave
Lower Main Cave
Main Cave
Qualicum River
Riverbend Cave
Andrés Annex
Cougar Cave
Euclataws Cave
Trails:
1 Karst
2 Main Cave
3 Eggshell Cave
4 Qualicum River
LEGEND
Road
Cave entrance
Trail
Picnic site
Parking area
Bridge
Visitor centre
N
0
50m

Fig. 7

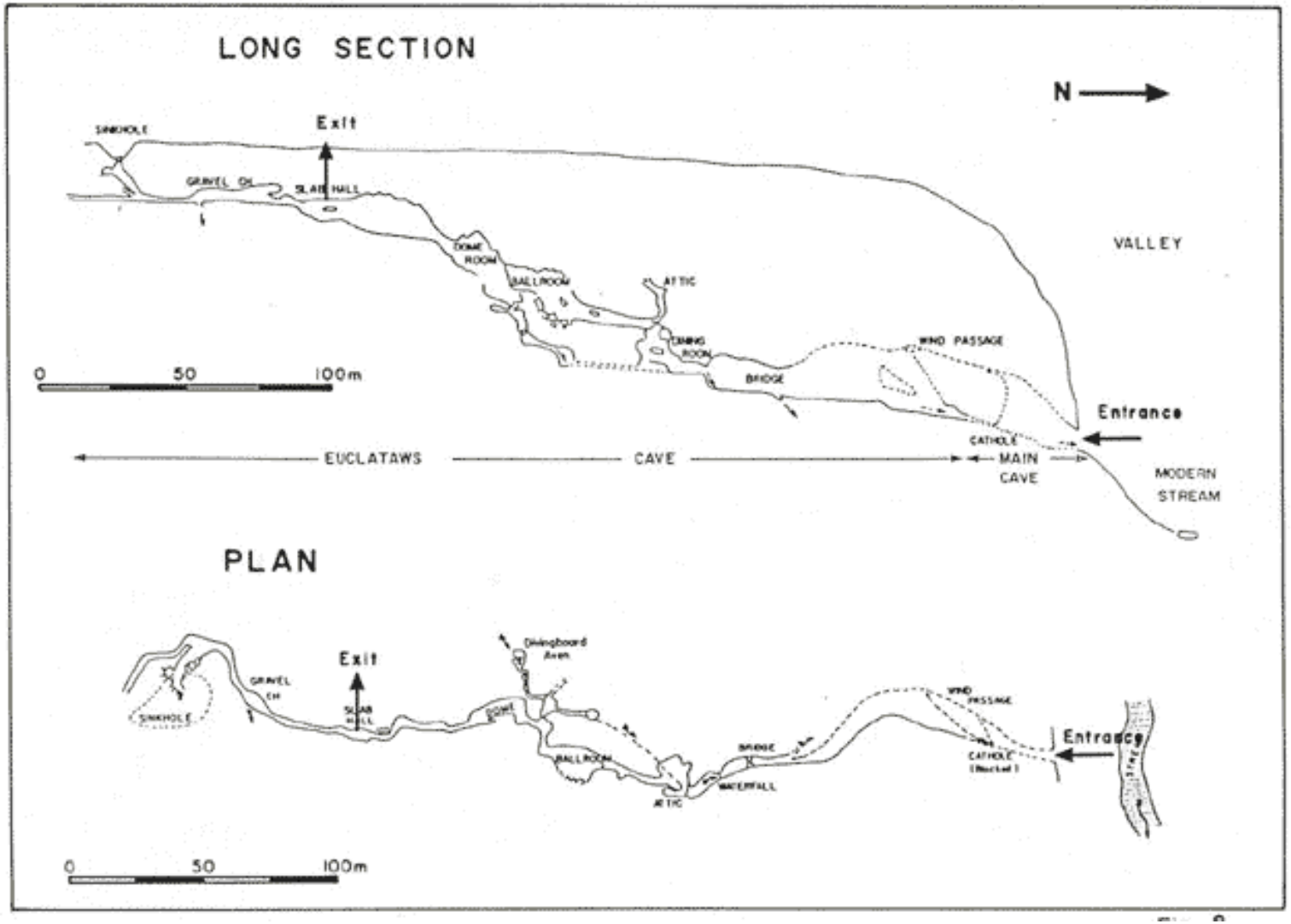
3. the resources can be developed with minimal impact and have high interpretive potential;
4. no general public access to such a high quality cave experience presently exists in Canada;
5. the park is readily accessible to major population centres and a large tourist market;
6. the resources are presently protected by provincial park status; and to a large extent, the development must be economically self-sufficient.

The development concept is described in phases to assist in adhering to the proper implementation process and in allocating the required funds. Two further notes of caution are to be stressed. First, the commitment to the preservation of the cave resources in Horne Lake Caves Provincial Park must be recognized and accepted as a long term commitment before any development and encouragement of public use is initiated. Second, the most effective development of the park will require the addition of a small but strategically located parcel of land. The feasibility of this acquisition should precede any commitment of funds to the development plan.

Phase 1

1. show cave development:
    - preparation of a development plan for the Euclataws/Main Cave system (see Fig. 8) in conjunction with the park interpretive plan showing trail locations, interpretive opportunities and lighting concepts. Fundamental to the plan is the determination of a tour group size which must be established.

EUCLATAWS - MAIN CAVE SYSTEM — Development



- pathway construction in Main Cave from the entrance to the Cathole including facilities for dirt and lint removal from visitors.
- tunneling from Main Cave to Euclataws Cave parallel to the Cathole including the installation of an air lock door system.
- pathway construction in Euclataws Cave from the cathole to the base of the waterfall pitch including electric lighting of special features such as the Umbrella.

2. visitor reception and interpretation:
    - preparation of an interpretive plan for the park
    - temporary parking area expansion in existing parking location to a capacity of approximately 25 vehicles.
    - construction of a temporary footbridge across the Qualicum River adjacent to the parking area.
    - construction of temporary reception centre where visitors can gather to be briefed prior to touring the caves and where basic interpretive information can be provided. This small facility (20 sq. meters of public reception area) will be combined with living quarters and office space for two on-site employees.
    - sanitary facilities will be provided adjacent to the temporary reception centre.

3. trail improvements:

- the "Main Cave Trail" from the reception centre to the entrance to Main Cave will be upgraded to Type 2 standard.
- the "Eggshell Cave Trail" to Lower Main Cave and Eggshell Cave will be developed to a Type 3 standard.
- a "Karst Trail" will be designed and constructed of a Type 2 standard linking the surface karst features in the park.

4. marketing and information:

- a market analysis will be conducted.
- a marketing strategy will be developed.
- a park logo will be developed.

5. research:

- resource studies for developing a park data base, as
- identified in the management policies, will be conducted.
- studies of the design and layout of the route through the
- Euclataws - Main show cave will be conducted. These must be
- undertaken in conjunction with the cave development plan.

6. park management:

- permanent on-site staff will be assigned to the park. Temporary accommodation and office space will be developed ii conjunction with the visitor reception facility described above.
- construction of a temporary equipment storage facility.

Phase 2

1. show cave development:
   - pathway construction from the Waterfall Pitch to an exit from the cave system in the vicinity of the Slab Hall including the provision for electric lighting systems.
   - Construction of an exit tunnel from the vicinity of Slab Hall to the surface including an air lock door system.
2. visitor reception
   - design and siting study of a central facility to serve as a reception, interpretive and administrative centre for the park operation including facilities for spelunking tour support such as equipment cleaning and storage and rescue and first aid equipment.
3. park management
   - design and siting study of permanent on-site accommodation for staff
   - design and siting study of permanent supply and servicing facility

Phase 3

1. show cave development:
    - installation of electric lighting

2. visitor reception:
    - construction of a visitor centre containing:
        - visitor orientation and tour registration
        - interpretive displays and media
        - visitor services (food, washrooms, gift shop etc.)
        - park administration offices
        - spelunking tour support facilities
    - construction of an access road and bridge across the Qualicum River to the site of the visitor centre
    - construction of a parking lot adjacent to the visitor centre to a capacity of approximately 50 vehicles

3. trails:
    - design and construction of trail (Type 2) from the cave exit above the Slab Hall back to the visitor centre by way of the natural exit to Euclataws Cave and other significant surface karst features.

4. marketing and information:
    - beginning of tours through the complete show cave system
    - implementation of marketing strategy

5. park management:
    - construction of permanent on-site accommodation for staff
    - construction of permanent supply and servicing facility

Phase 4

1. trails:

* construction of the "Qualicum River Trail" for interpretation purposes and general hiking within the park.

2. picnic sites:

* construction of picnic sites adjacent to the visitor centre and at two sites along the Qualicum River.

D. MANAGEMENT POLICIES

1. Resources

- fundamental baseline research should be conducted to provide information on:

a) hydrology

- it is critical to more accurately define the recharge area of the caves and to map the water flows which are active in the park. Also important is the seasonal variation in water volumes which affects cave access.

b) biology

- no complete biological inventories have been conducted in the Horne Lake Caves and some baseline knowledge of the presence or extent of life forms in the caves is needed. Similarly, documentation of the surface resources is needed. In the future this information will be important in assessing the impacts of development and visitor use of the park.

c) climatology

- any development of the caves for visitor use could significantly alter the micro climate of the caves. Conditions of air flow, temperature, humidity etc. are important to the maintenance of the natural evolution of the cave and highly susceptible to impact from high visitor volumes and artificial developments such as lights, entrances and enlarged passages. Documenting present conditions will be important to the assessment of development impacts and the adoption of preventative strategies.

- follow-up resource studies should be undertaken on a regular basis to monitor changes in the environment from the baseline conditions.

- investigations should begin with adjacent land owners to acquire the land necessary to control development and protect park resources.

- land use agreements, for adjacent lands that are identified as being significant in the hydrological or biological functioning of the caves, should be developed with the appropriate land owners to ensure the maintenance of the natural qualities of the karst system within the park.

- a fire protection plan should be developed in cooperation with the Ministry of Forests and the Texada Logging Ltd. which will ensure the protection of the park resources, especially the water quality.

- all facility development within the park should avoid the zone on the surface above the actual caves. Along the line of the passage ways this zone could be approximately +/- 30m. on either side with wider buffers locally as identified by hydrologic work.

- all facility development, both above and below ground, should avoid the alteration or removal of natural resources to the fullest extent possible.

2. Visitor Use

- visitor movement, both on the surface and underground, should be limited through informal means to designated trails and areas. This will protect certain ecologically sensitive resources and special underground features.

- visitors should gain access to the caves and surface karst features through a central point where use restrictions and necessary information can be communicated. This centralized access will also allow continuous monitoring of visitor use levels.

- visitor activities that are not directly related to the karst environment in the park should be encouraged to take place along the Qualicum River.

- food items and smoking must not be allowed underground to protect cave resources.

3. Facility Construction

- all materials used in facility development both on the surface and underground should be selected recognizing the potential impacts on the chemical balance of the cave environment. Known problem materials which produce negative impacts and which should therefore be used with great care include: asphalt, concrete, steel and aluminum.

- artificial entrances to the underground should be sealed with air lock door systems to ensure minimal disruption to the natural air movement within the caves.

- visitor entrances to the underground should be located and developed to minimize the transfer of dirt, lint and body oils into the cave system.

- passageway development should be the minimum size required which would allow general public access in a way which would provide an appreciation of the natural character of the underground environment.

E. MARKETING AND INFORMATION

The development and operation of a show cave at Euclataws Cave in Horne Lake Caves Provincial Park is a major undertaking involving significant commitments of both financial and manpower resources. It must be approached with a clear understanding of two basic principles: 1. it is imperative that the development be sensitive and totally compatible with the resource protection requirements of the cave; and 2. the project has the potential to recover financial investments and operating costs if development and operation is efficiently carried out and marketing is equally effective in achieving the necessary visitor numbers.

> "the project is probably highly warranted and feasible. It would be a good investment if done with private capital and could probably be self supporting if done as a provincial park. Its success may provide an encouragement for other such visitor attractions, with the associated benefits, throughout western Canada." (Fairchild, 1984)

Given the nature of the task of identifying and implementing a marketing strategy of such a magnitude and compatible with the scale of the operation being proposed in this plan, it is clearly not within the scope of this plan to provide such details. What has been identified in this plan is the necessity to conduct a thorough market analysis and to undertake the planning of a comprehensive marketing strategy. These steps are considered important steps to be undertaken early, as noted in the development plan. However, as also noted in the development plan, the implementation of the marketing strategy should be staged to parallel the show cave development at Euclataws.

Attention must be paid to the visitors from the moment they are encouraged to come and experience the park. Even during the continuing construction of the facilities it is important to provide as much encouragement and support for the visitor as possible to ensure his return and enthusiasm for the final park development.

One final observation is that the names and logo used in the marketing strategy should be given careful consideration because of their importance in creating an attractive public image. Although important, the fact that existing names have been accepted for both the park and the individual caves, is not necessarily sufficient reason for retaining them.

BIBLIOGRAPHY

Aley, T. 1984. Letter to B.Downie, PRP Consulting, Victoria, B.C. regarding the significance of the Horne Lake Caves. (December 18, 1984).

Cave Management Services. 1984. Cave Inventory and Assessment Update for Horne Lake Caves Provincial Park.Prepared under contract to the South Coast Region Parks and Outdoor Recreation Division, Ministry of Lands, Parks and Housing.

Copland, Hugh J. 1982. Geology and Genesis of Limestone Caverns at Horne Lake Provincial Park. U.B.C. Thesis, Department of Geology, Faculty of Science.

Fairchild, S.E. 1984. "Assessment of Commercial Tour Opportunities in Horne Lake Provincial Park", Letter to B. Downie, PRP Consulting, Victoria, B.C. (December 21, 1984).

Ford, D.C. 1976. Report upon the Euclataws-Main Cave System of Horne Lake Caves Provincial Park, V.I. Unpublished report to the B.C. Parks Branch, 28 p.

Ford, D.C., Gascoyne, M., and Latham, A.G. 1978. Report upon the Riverbend Cave System of Horne Lake Caves Provincial Park, Vancouver Island. Unpublished report to the B.C. Parks Branch, 7p.

Griffiths, Paul. Communication with B. Downie, PRP Consulting, Victoria, B.C. Notes on Estimated Carrying Capacities for the Horne Lake Caves. (October 27, 1984).

Griffiths, Paul. 1975.Horne Lake Wonder Caves. Gold River Maquinna Publishing.

Hronek, Clarence. 1972. "A Day in Euclataws Cavern". British Columbia Motorist, March-April Edition, Vancouver, p.4-6.

Northcote, K.E. Limestone of the Horne Lake - Cascade Cave System, Vancouver Island. V.I.C.E.G. Geological Note #2.

Parks and Outdoor Recreation Division. 1980. Caves Resources in British Columbia : A Discussion Paper. Ministry of Lands, Parks and Housing, Victoria, B.C.

Parks and Outdoor Recreation Division. 1981. A Statement of Crown Land Cave Policy and Administration. Ministry of Lands, Parks and Housing, Victoria, B.C.

Vancouver Island Cave Exploration Group, 1984. "An Assessment of the Horne Lake Caves". Letter to B. Downie, PRP Consulting, Victoria, B.C. (October 21, 1984).

Whitfield, P. 1984. "Estimated Horne Lake Caves Carrying Capacities". Memo to planning workshop participants. (October 26, 1984).

Zuber, R.E. 1976. A Compendium of Components Relevant to Cave Resource Management. University of Wisconsin - Madison Thesis, Department of Landscape Architecture, Faculty of Science.

APPENDICIES

CALIFORNIA CAVERNS, Cave City
***Calaveras* County**

MOANING CAVERN, Gold Country
***Calaveras* County**

BOYDEN CAVERN, Kings Canyon
Sequoia National Forest

December 21, 1984

ASSESSMENT OF COMMERCIAL TOUR OPPORTUNITIES IN HORNE LAKE PROVINCIAL PARK

At your request, I conducted a site visit and field assessment of Euclataws Cavern in Horne Lake Park. Based on that visit and the two-day work/study session, I submit the following:

1. Euclataws Cavern is of more than sufficient size, beauty and interest to consider for commercial show cavern development. It compares favorably with most of the highest visited caverns in the United States. It is larger and contains features superior to Ruby Falls in Tennessee, which is the second most visited cavern in the US. Although not as large as Carlsbad or Blanchard Springs Cavern, its overall visitor appeal would be comparable, and its location is more favorable than either.

2. The location has the potential to supply ample visitors to make the development economically *very* attractive. Including motel, hotel and commercial camping sites, there are about 7,000 tourist accommodations within a one-hour drive of Horne Lake Caves Park. In addition, there are provincial campgrounds. All of which are mostly full during the summer season. Average stay is about 3 days with average occupants of 2.5. This would provide 5,800 visitors per day turnover. Experience has shown that 1/4 to 1/3 could be expected to visit a well-publicized and well-developed cavern park, yielding between 1,450 and 1,940 potential visitors per day. Additionally, there are about 66,000 residences which have a large number of guests each season due to the attractive nature of the area. These could be expected to contribute about .8 visitors per house per season, yielding about 400 additional potential visitors per day. If the park will be well promoted (similar to Butchart Gardens), it can be expected to draw from areas as far away as southern Oregon and Banff regularly. This should increase the pressure on accommodations over time, causing further expansion of accommodations and account for between 250 to 700 potential visitors per day. Thus the potential visitors base is from 2,100 to 3,040 per day, or, given about 120 visitor days per season, the seasonal visitation potental is 252,000 to 364,800 visitors per 120-day summer season. Off-season figures would be substantially reduced but would still be significant. The above figures represent visitation potential at maturity which, given proper (intensive) promotion and adequate development, could be expected to occur within 10 years. Clearly then, the location can be considered very favorable for this type of development. In fact, if Horne Lake Park is fully developed, the area could use one or perhaps two additional commercial caverns, opening up further business opportunities and economic development. People who see one cavern usually want to see another.

3. If the full potential of economic benefits for the area are to be realized, cavern and park development would ultimately have to be designed to accommodate about 3,000 visitors per day or 300 per hour. Caverns frequently operate 10 hours a day--easily done at high latitudes in the summer. On busy days, tours could easily accommodate 30 persons with 10-minute spacing. Experience has shown that very little impact difference occurs on the cavern itself between small visitor numbers or large visitor numbers with properly designed trails and improvements. The development costs and trail characteristics for this cavern would be essentially the same for 10 persons per hour or 300 persons per hour. From experience in conducting cavern tours, it can be stated that 10-minute spacing would provide more than adequate separation to insure a quality tour. At any rate, this kind of demand would not materialize for a number of years (perhaps 10 or so), and would allow for modification of procedures as visitation demands build. No attempt needs to be made at this time to artificially set lower capacity figures than experience dictates. As demand builds, attempts will unavoidably be made to accommodate the additional visitors, and if unreasonably low expectations are in effect the long term damage could be considerable. Small volumes mean high costs per visitor while high volumes mean low costs per visitor, making it more likely not to require public tax monies.

5. The character of the cavern indicates that the trail should begin at Lower Main Cave and continue up through Euclataws to as far as Slab Hall. From there it may need to exit by way of a tunnel or shaft to the surface. Exact trail location and details can only be worked out with further study and during actual construction.

6. If Euclataws were developed privately, lighting costs for the fully developed cavern trail would probably be between $70,000 and $120,000, and could be as much as $200,000 more if contracted to standard unionized electrical contractors who are unfamiliar with cavern lighting procedures. Impact costs to cavern resources would be minimal with experienced cavern lighting personnel but could run very high with well meaning but inexperienced workers.

7. The trail work could be done for as little as $200,000, depending on who does it and what beyond the obvious is required. Again, standard contracting procedures may up the costs by several fold. The U.S. Government spent about seven million dollars to develop Blanchard Springs Cavern, including a $1,500,000 visitor center. Most knowledgeable cavern owners and developers remark that it could have been done for as little as $2,000,000 with the same results if done privately.

While the total development cost may be from $270,000 to $1,000,000 for the cavern work, the pay back rate would be acceptable even assuming the higher cost:

Projected cost	$1,000,000
15°6 recovery	150,000
Visitors at $6.00 ea	25,000/yr

(8 hour/day -120 days/season) 26/hr

Since the cavern should easily draw twice that number even early in its operation, then as much as five times that figure at maturity (ten years), no difficulty should be encountered maintaining operational expenses and reasonable pay back rates even at the higher cost level. Of course, these figures are based on a very cursory look at the project and may warrant a more in-depth financial analysis.

The economic gain to the area's economy can be assessed. If a figure of 500 visitors/day is assumed for 120 days/season, and we assume about $25.00/day each visitor, we see about $1,500,000/year direct income. Since money is usually circulated several times, the multiplication factor would bring the total gain to about $4 million, or about 150 to 200 jobs. There may be additional gains if the draw of this cavern encourages other attractions, perhaps even another commercial cavern, to open nearby or at least elsewhere the island.

I can conclude, then, from the above analysis that the project is probably highly warranted and feasable. It would be a good investment if done with private capital and could probably be self supporting if done as a provincial park. Its success may provide an encouragement for other such visitor attractions, with the associated benefits, throughout western Canada.

Respectfully submitted,

Stephen E. Fairchild, President

OZARK UNDERGROUND LABORATORY

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December 18, 1984

Mr. Bruce K. Downie
PRP Consulting
573 Demeresq St.
Victoria, B.C. V8Z 1X5
Canada

Dear Bruce:
I very much enjoyed participating in the planning work for Horne Lake Caves Provincial Park. During the meetings you asked for a letter report on the significant: of the cave resources within the Horne Lake Caves Park.

As I told you at the meeting, have evaluated at least a dozen sites in the U.S. for po=sible designation as National Natural Landmarks. To achieve designation, a site must contain natural features which are of national significance. In addition, the condition of the site and its use must be such that the natural integrity of the significant features is maintained. Using these criteria and the observations from my site visit of December 7, 1984, it is my conclusion that:

1) The existing cave system within Horne Lake Caves Provincial Park is a supurb example of cave and karst development and is of North American significance.

2) Under present conditions, Euclataws Cave is in nearly pristine condition, and the cave retains an unusually high degree of natural integrity.
3) Careful development of Euclataws Cave as a show cave could be accomplished while retaining a high degree of natural integrity. The greatest threat to the natural integrity of this cave is unsupervised visitation with attendent damage and vandalism of natural features.

Sincerely,

Thomas Aley
Director